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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,102	10/14/2004	Shinji Tsuchikawa	TSUK0010	6590
24203	7590	04/03/2006	EXAMINER	
GRIFFIN & SZIPL, PC SUITE PH-1 2300 NINTH STREET, SOUTH ARLINGTON, VA 22204			WU, IVES J	
			ART UNIT	PAPER NUMBER
			1713	
DATE MAILED: 04/03/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/511,102

Applicant(s)

TSUCHIKAWA ET AL.

Examiner

Ives Wu

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/10/06</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

(1). Applicants' Remarks filed on February 10, 2006 has been received and acknowledged.

The rejections of claims 1-12 in the prior Office Action dated August 11, 2005 is removed because the prior art reference Tsuchikawa et al (US006667107B2) can not establish 103 rejection due to the same assignee, two common inventors and filing date as indicated on applicants' Remarks filed on February 10, 2006.

A new ground of rejections for claims 1 - 12 is introduced in the following paragraphs.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(2). **Claims 1 - 4, 7 - 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wrezel et al (US004777227) in view of Kawase et al (US003953539) and Ernst et al (US003046231).

(3). Wrezel et al (US004777227) disclose a high temperature thermosetting resin compositions which comprises admixing (1) an ethylenically monosubstituted unsaturated

Art Unit: 1713

monomer in which substituent is an aromatic moiety such as styrene, (2) an ethylenically alpha,beta-disubstituted unsaturated monomer in which each substituent is an aromatic or benzylic acid moiety such as acenaphthylene and, (3) a glycidyl ester of a monoethylenically unsaturated acid such as glycidyl acrylate, glycidyl methacrylate, glycidyl crotonate, glycidyl tiglate etc. Adding the resultant terpolymer admixture to the copolymer formed by admixing (a) an anhydride of a dibasic olefin acid such as maleic anhydride and (b) ethylenically monosubstituted unsaturated monomer such as styrene (Abstract, Col. 3, line 11-30, Col. 4, line 31-36, Col. 4, line 54-56). A catalyst such as Lewis Base including benzyldimethylamine, 2-methylimidazole, benzyldiethylamine, etc (Col. 5, line 48-52). By utilizing such a cross-linking agent (copolymer) which is incorporated in a high molecular weight compound, it is possible to obtain a solid composition of matter which is useful in electronic circuitry, solid composite possessing a relatively low dielectric constant and high thermal stability (Col. 4, line 11-16). Examples of high temperature thermosetting resin compositions which may be prepared according to the process of this invention will include mixtures of styrene, acenaphthylene and glycidyl methacrylate crosslinked with a copolymer of styrene and maleic anhydride; p-bromostyrene, acenaphthylene and glycidyl methacrylate crosslinked with a copolymer of styrene and maleic anhydride; etc (Col. 6, line 50 – Col.7, line 42). At the end of predetermined cure period, the resin composition is then recovered for use in dielectric coatings or as a laminate material in a circuit board (Col. 6, line 12-15).

Illustrated in Example II, the thermosetting resin is coated onto a glass cloth in order to provide a laminating varnish (prepreg). The prepreg was heated to a temperature of 170 °C and maintained thereat for a period of 78 mins followed by a post-cure. The dielectric constant at room temperature, 0% relative humidity, and 1 mHz was 2.57 (Col. 8, line 16-41).

(4). As to the component of a metal salt of a disubstituted phosphinic acid in **independent claim 1**, Wrezel et al **do not teach** this metal salt of a disubstituted phosphinic acid.

However, Ernst et al (US003046231) teach that they found the organic phosphinic acids which are useful as inhibitors having the following structure:



Where R is an aliphatic, cycloaliphatic, or aryl radical; and R' represents hydrogen, aryl or aliphatic radical, and M is hydrogen or a salt-forming radical. Col. 3, line 17-27.

Kawase et al (US003953539) also teach the phosphorus compound used in an amount sufficient to inhibit the coloration of the blend resin; Examples of phosphorus compound include phosphinic acid; mono- or disubstituted phosphinic acid; There can also be used the metal salts of phosphinic acid, phosphinous acid, and the metals selected from sodium, aluminum, Col. 3, line 31 – Col. 4, line 38.

The benefit of using phosphinic acid and its metal salt is to inhibit the decoloration because of aging effect – that is, from becoming darker on aging. The protective agents or discoloration inhibitors employed in the process having all pronounced reducing properties. They do not interfere with the reaction completion, and rather have a reaction-promotion effect, so that they may also be described as reducing type catalysts, Col. 3, line 1-13 (Ernst et al - US003046231). In other words, more functional groups or double bonds in the thermosetting resin will be reacted, less pending functional groups or double bonds will be in the final product to improve the overall quality of the final product from deterioration, degradation by aging. Another benefit of using phosphinic acid and its metal salt is to enhance the flame retardance because phosphorus compounds are generally known as fire-retarding agents, Col. 2, line 10-11 (Kawase et al -US003953539).

Therefore, it would have been obvious at the time applicant's invention was made to include the metal salt of organic phosphinic acid salt of Kawase et al in the thermosetting resin composition of Wrezel et al, because it will obtain the aforementioned benefits, moreover, the phosphinic acid salt taught by Ernst et al is genus, the metal salt of organic phosphinic acid disclosed by Kawase et al is species, one ordinary skill in the art would expect that all species works well for genus, motivated by a reasonable expectation of success. *In re O'Farrell*, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988).

As to the limitation of dielectric constant of the thermosetting resin composition to be 3.0 or less at a frequency of 1 GHz or more in the **dependent claim 2** and **independent claim 9**, in view of the substantially identical thermosetting resin composition disclosed by applicant's and combination of Wrezel et al, Kawase et al, it is examiner's position to believe that the dielectric constant being 3.0 or less is inherently possessed by thermosetting resin compound in the

combined prior arts. Because USPTO does not have proper means to conduct experiments, the burden of proof is now shifted to the applicant to prove otherwise. *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

(5). **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wrezel et al (US004777227) in view of Ernst et al (US003046231) and Kawase et al (US003953539), and further in view of Makino et al (US004128598).

As to the monomer of formula (VII) in the dependent claim 5, Wrezel et al do not teach this monomer represented by instant claim in formula (VII).

However, Makino et al **teach** use of bismaleimide in the thermosetting resin compositions (Col. 2, line 66 – Col. 3, line 5).

The advantage of using bismaleimide compound is to provide thermosetting resin compositions having prominent heat resistance, electric insulation and mechanical strength at high temperature (Col. 1, line 29-32).

Therefore, it would have been obvious at time the invention was made to include the bismaleimide compound such as 4,4'-methylene-bis-(N-phenylmaleimide) taught by Makino et al in the thermosetting resin of Wrezel et al in order to obtain the above-mentioned advantage.

(6). **Claims 6 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wrezel et al (US004777227) in view of Ernst et al (US003046231) and Kawase et al (US003953539), and further in view of Luttrull (US006534181B2).

As to the epoxy resin in the **dependent claims 6 and 12**, Neither Wrezel et al nor Kawase et al, Ernst et al teach the use of epoxy resin in the thermosetting resin.

However, Luttrull (US006534181B2) **teaches** the use of epoxy resin in a resin blend (Title).

The advantage of blending epoxy resin in the thermosetting composition is to reduce brittleness of the cured resin system (Col. 2, line 56-57).

Therefore, it would have been obvious at time the invention was made to blend the epoxy resin of Luttrull with the thermosetting composition of Wrezel et al in order to obtain the above-mentioned advantage.

Art Unit: 1713

***Response to Arguments***

(7). Applicant's arguments, see pages 2-3 in applicants' Remarks, filed on February 10, 2006, with respect to the rejection(s) of claim(s) 1 ~ 12 under 103 rejections of Tsuchikawa et al (US006667107B2), Kawase et al (US003953539) and Ernst et al (US003046231) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wrezel et al (US004777227), Ernst et al (US003046231), Kawase et al (US003953539) and Luttrull (US006534181B2), Makino et al (US004128598).


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ives Wu whose telephone number is 571-272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner: Ives Wu  
Art Unit: 1713  
Date: March 29, 2006

  
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PRIMARY PATENT EXAMINER  
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